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EDITORIAL

On these pages the editor offers his opinions, unshackled by advertising patrons and unrestrained by anything save a sense of the decent and the truthful – the editor, alone, is responsible for their type, their tone and their tenor.

THE QUICK AND THE DEAD

FIFTY-SIX persons are dead in the Western states because a pharmaceutical manufacturer was too quick in marketing a so-called elixir,* compounded with ingredients, whose toxicity had not been adequately studied.

It is a repetition of the unfortunate experiences, with dinitrophenol, with thorium and thallium and thyroid, with radium, and with other such potent drugs let loose, without law or license, upon our drug-consuming public.

Things are bad enough when such calamities come, as they have come, even with official drugs, such as cinchophen and amidopyrine, drugs which seemingly had the *full approval of the medical authorities,* and which had been used by them long before their subtle toxic actions became known.

But with this elixir, compounded with sulfanilamide and diethylene glycol, in which this drug is readily soluble, the common people were the guinea pigs, and this is *not* the modern method of establishing the toxicity of drugs.

Diethylene glycol ($HOCH_2CH_2OCH_2CH_2OH$) is a hygroscopic, practically odorless liquid, boiling at 244.5° C., and is similar in many respects to ethylene glycol ($HOCH_2CH_2OH$) which is in the familiar "Prestone" anti-freeze, but differs sufficiently to give it special uses in the chemical industry. That the toxic composition of this material may have been known to its manufacturers, is suggested in the following statement, although only by inference:

"In common with other glycols, *propylene glycol* has the property of lowering the freezing point of water solutions, the degree depending on the concentration of the glycol. This characteristic, coupled with the fact that *propylene glycol is physiologically harmless,* has led to the use of this product as an anti-freeze in milk and cream pasteurizing equipment as well as in brewery cooling systems." In the February, 1937, issue of this Journal appeared this statement: "The acute toxicity of *diethylene glycol* was found to be twice as toxic to rabbits

*An elixir is defined as a sweetened hydro-alcoholic fluid.

as either ethylene or propylene glycol." Incidentally it is used, in preference to glycerin, as a hygroscopic agent, in a well-known brand of cigarettes.

Indeed the new United States Dispensatory warns against the use of all the glycols until their harmlessness has been established.

On the other hand, there is ample testimony that sulfanilamide itself is not a "foolproof" drug.

In its Journal (Sept. 25), the American Medical Association gives space to eight articles that cite untoward reactions in certain patients following the use of the drug. Yet the burlesque dramatizing of this sordid business on the screen insisted that the solvent was wholly to blame.

But irrespective of the identity of the toxic factor or factors, it is criminal that our system allows so archaic, so inhuman, so deadly a method of evaluating new drugs, when we have such research facilities and test animals from daphnia to dog, at our disposal.

Upon receipt of news of the calamity the entire force of the Federal Food and Drug Administration was on the job tracing shipments of the poisonous drug which brought death to nine patients in Tulsa, Oklahoma, and five in East St. Louis, Illinois, recently. Immediately upon the report of the poisoning, officers of the Administration were sent to Tulsa and to the manufacturer's main establishment and branch houses.

All shipments of the medicine are being located for seizure by Federal agencies or by co-operating State and city authorities.

In commenting on the Federal activities, W. G. Campbell, Chief of the Food and Drug Administration, said: "We do not as yet know the explanation of the fatalities. It has been reported that the solvent, diethylene glycol, is probably the responsible agent. We do know that there was something radically wrong.

"It is unfortunate that under the terms of our present inadequate Federal law the Food and Drug Administration is obliged to proceed against this product on a technical and trivial charge of misbranding. Nevertheless we propose, as a public health measure, to seize every outstanding consignment of this drug that we can find and to enlist the co-operation of State and city authorities where any lots are encountered that have passed out of Federal jurisdiction. We intend to communicate with Canadian authorities regarding any lots which may have been distributed in that country in order that they may take appropriate steps.

"This occurrence emphasizes how essential it is to public welfare that the distribution of highly potent drugs should be controlled by an adequate Federal Food and Drug law. While every possible effort under our present legal authority is being made to safeguard the public health in connection with the distribution of this deadly preparation, we should not lose sight of the fact that we had many deaths and cases of blindness resulting from the use of another new drug, dinitrophenol, which was recklessly placed upon the market some years ago. Deaths and blindness from this cause are continuing today. We also should remember the deaths resulting from damage to the liver that have occurred from cinchophen poisoning, a drug often recommended in such painful conditions as rheumatism. We also have unfortunate poisoning, acute and chronic, resulting from thyroid and radium preparations improperly administered to the public.

"These unfortunate occurrences may be expected to continue because new and relatively untried drug preparations are being manufactured almost daily at the whim of the individual manufacturer, and the damage to the public health cannot be accurately estimated. The only remedy for such a situation is the enactment by Congress of an adequate and comprehensive national Food and Drugs Act which will require that all medicines placed upon the market shall be safe to use under the directions for use, and for potent drugs and new drugs a Federal licensing system is probably the answer."

With which, in principle, we thoroughly agree.

IVOR GRIFFITH.

THE WHY AND THE WHENCE

But beyond the bright search-lights of science,
Out of sight of the windows of sense,
Old riddles still bid us defiance;
Old questions of Why and Whence.

There fail all sure means of trial.
There end all the pathways we've trod,
Where man, by belief or denial,
Is weaving the purpose of God.

—*Whetham.*

OF LITTLE AND LESS

THE wag who described the specialist as one who knows more and more about less and less, missed describing that type of specialist who eventually reaches the point of knowing practically everything about nothing. But the ultra modern chemist may be described, and accurately so, as one who learns more and more, *with* less and less. Witness the following article which appeared in that dynamic little bulletin issue by the Arthur D. Little organization.

"Within the last few years, chemists have begun to work accurately with much smaller quantities of materials than were formerly thought necessary for complete analysis. This has been made possible by utilization of special apparatus developed primarily for other fields, the adaptation and extension of older principles and instruments, and the development of more specific reagents.

The spectrograph, as an instrument for the exact identification and evaluation of many metals and non-metals in alloys, biological materials, inorganic compounds and the like, is a newcomer among chemical tools. Perhaps even newer in application, and not so well known or universally applied, are x-ray diffraction studies of crystalline materials of every description. The Dow Chemical Company has pioneered in these methods, and has photographed and classified over 4000 diffraction patterns, of which over 1000 are of individual inorganic chemical substances. At the Boyce Thompson Institute and elsewhere, x-ray methods have been used to show the essentially crystalline nature of many plant tissues. It is reasonable to suppose that x-ray studies, like spectographic absorption investigations of liquids and some solids, will become less empirical and more exact as research workers explore their possibilities.

Other analytical devices of earlier origin have undergone recent changes that have increased their sensitivity and extended their scope. Visual colorimeters, for analyzing colored liquids on the basis of intensity and tint, and turbidimeters, for estimating suspended material with the aid of the eye, are not new. The substitution of photoelectric cells and vacuum tube galvanometers for the eye in such instruments is comparatively new, however, and has made possible detection of color differences due to variations in concentration quite imperceptible to the eye. There is every reason to believe that many chemical determinations now carried out by the conventional gravi-

metric or volumetric methods might be made as accurately and more rapidly by photoelectric measurements.

It has been shown recently that instruments for determining the color of surfaces and opaque materials (by reflected rather than transmitted light) are more sensitive than the eye, and give more information about the color components present. A photoelectric device of this nature is the Hardy Color Analyzer, which is able to show graphically color differences and characteristics that escape the eye entirely. To all those who work with color, instruments of this type are opening new fields.

Determinations of acidity and alkalinity, and small changes therein, have always been important to analysts everywhere. For many years, colorimetric methods based upon color changes in organic dyes were depended upon to give this information. Electrical measurement of acidity and alkalinity with the hydrogen, calomel and antimony electrode are more recent, but the glass electrode with its vacuum tube circuit, embodying in a single instrument wide range and great sensitivity to small differences, together with complete indifference to color, turbidity, viscosity and other limiting conditions that have always plagued chemists using the older methods, has brought new dignity and precision to determinations as old as chemistry itself.

Although known and used without much modification for some time, refractometers and polarimeters should at least be mentioned, because they are of great importance in special cases and often furnish invaluable information based upon optical behavior. It is hard to say who would be handicapped more, the worker in oils, soaps, waxes and solvents without a refractometer, or the sugar chemist without a saccharimeter or other device for measuring optical rotation.

Interesting more because of the technique employed and the reagents used than because of any special apparatus required, the spot tests for identifying minute quantities of many metals in solution have recently received well-merited attention. These tests are highly sensitive and extremely specific, because a single drop of reagent in contact with a single drop of the solution, on a spot plate, will give a characteristic color for the metal sought. Numerous organic reagents for use in sets for this work are now on the market.

No mention has been made in this summary of the methods of organic micro-analysis developed by Pregl and others, the extensions in the field of inorganic micro-analysis which were begun by Emich, or the extensive applications of chemical microscopy to the study of minute quantities of materials of every description. Of all the instruments available for the chemical study of small samples, the microscope is probably the least appreciated and the most misunderstood. Petrography, polarization studies, ultra-violet and ultra-microscopy, and crystallization studies are but a few of the applications of a many-sided instrument which to all too many is little more than a glorified magnifying glass."

Vegetal Reduction of Dehydroascorbic Acid. E. F. Kohman and N. H. Sanborn, *J. Ind. & Eng. Chem., 89,* 1195 (1937). The authors have found that the juice of legume seeds contains glutathione and additional substances which reduce dehydroascorbic acid. These substances therefore act as a protection again the oxidation of ascorbic acid by oxygen of the air.

The reduction of dehydroascorbic acid by these substances is catalytically accelerated by an enzyme. After the dehydroascorbic acid is reduced, an enzyme catalyzes the reduction of the oxidized glutathione and perhaps other substances oxidized by the dehydroascorbic acid. These substances are found to seriously interfere with the estimation of ascorbic acid by titration with 2,6-dichlorophenolindophenol. Copper does not affect the reduction of dehydroascorbic acid by these reducing substances as it does the oxidation of ascorbic acid by oxygen. It has not been determined whether iodide added with the dehydroascorbic acid is responsible for the lack of effect of copper on the reduction.

It is not known that the marked reducing value toward 2,6-dichlorophenolindophenol that develops in raw pea juice upon the addition of dehydroascorbic acid represents biologically active ascorbic acid (Vitamin C).

Until these questions can be answered, definite limitations must be placed upon present chemical methods for evaluating the vitamin C content of certain plant materials. L. J. K.

ORIGINAL ARTICLES

*APPEARANCE OF N. F. VI CRUDE VEGETABLE DRUGS UNDER ULTRA-VIOLET LIGHT

By Marin S. Dunn and Wilton H. Kimmer

The Authors have tabulated in the following article the visible effects of invisible light (ultra-violet) on fresh surfaces of almost every crude vegetable drug in the current National Formulary.

WHOLE, crude vegetable drugs of the N. F. VI were placed, one at a time, on the stage of the Hanovia Mercury Vapor Lamp, Alpine type. The appearance of each drug was recorded (column 2, table 1). Then the drug was broken, and in the case of types like Calumba and Bryonia, the surface of the drug was scraped as well. The color of the freshly fractured or scraped surface was recorded (column 3, table 1). Attempts to classify colors of the broken surfaces of certain leaf drugs, apii fructus, cataria, etc., were unsatisfactory. The term "not striking" has been used to indicate that in the opinion of the observers the color changes when the drug was placed under the Hanovia lamp were not sufficiently impressive to be recorded accurately. Except in the most general way, there has been but little attempt to relate color production with morphology.

Under the Hanovia, the appearance of certain drugs such as Hydrastis, Sanguinaria, Berberis, etc., was very characteristic. A number of the drugs belonging to this "more striking" list were placed under the battery of argon bulbs, described to the Plant Science Seminar at their Oklahoma meeting. The results are recorded in columns 4 and 5, table 1. In general, for this group, the use of the argon bulbs was satisfactory, although in all cases tried, the resulting colors were less intense.

Two independent observers checked each other's evaluation of colors in all cases.

The observations were checked the second time, using new samples of crude drugs as the source.

The findings are presented below in table form.

*Philadelphia Meeting Plant Science Seminar, 1937.

TABLE I

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Adonis	Occasional lavender areas	Stems: light yellow or tan	Not striking. Could not get the effect	
Aletris	Rootlets of 2 types: (a) light lavender, (b) reddish brown	Rhizome: strikingly yellow		
Anisum	Fruits show light markings (often ribs are light)	Fractured surface lavender		
Apii Fructus	Not strikingly different Fruits are browner			
Apocynum	Gen'l appearance almost black. Transverse fissures light blue	Light blue cortex. Inner surface greenish-brown		
Aralia	Cork becomes darker and more velvety and where missing, a beautiful light bluish fluorescence appears	Light bluish	Cork reddish	Bluish-white
Areca		Marbled with alternating somewhat radially arranged irregular bands of cream and dark brown	Not striking	

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Arnica	Pappus darker brown—florets show light areas			
Asarum	Rhizome shows numerous bright points	Bright, light yellow		
Avena	Some fruits light; some dark	Cut surface of both types bluish		
Berberis	Dark brown with striking yellow fluorescence in places where bark is broken	Intense yellow fluorescence		Yellowish fracture, very satisfactory
Bryonia	Brownish with grayish patches	Light center, bordered with blue margin		
Buchu	Under surface lighter than upper. Extreme margin often lighter than the rest of leaf			
Cactus Grandiflorus				
Calamus	Bluish with dark spots	Light blue	Not striking	Purplish-white

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Calendula	Florets yellower			
Calumba	Beautiful combinations of concentrically arranged bands of yellow and gray-blue	Cut surfaces show same colors	Same color bands, but weaker	Fracture satisfactory
Cambogia	Darker			
Cascara Amarga				
Castanea	Darker			
Cataria	Stems, under surface of leaves—light blue			
Caulophyllum	Rhizome and roots dark brown with numerous light yellow and bluish points	Blue		
Chimaphila	Darker			
Chionanthus	Outer surface (cork) darker. Inner surface—not much change	Bright blue	Not striking	Violet-white fracture

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Chondrus	Whiter than in ordinary light			
Cimicifuga	Darker with minute light points (roots). Each light point is really a bright ring about a darker center	Lavender		
Cocculus	Not strikingly different	Inner surface of fruit bluish. Seed—cream colored		
Colchici Cormus	Lighter	Light fractured surface		
Colocynthis	Not striking	Not striking		
Condurango	Outer surface gets darker. Inner surface tan. Not striking	Fracture shows prominent blue center area. Scraped inner surface bluish		
Convallariae Radix	Darkens and roots and rhizomes show shining spots of orange-yellow where fractured	Orange-yellow		
Coriandrum	Various colors from brown to whitish			

TABLE I—CONTINUED

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Corydalis	Display of colors, from dark brown to white, depending somewhat on translucency			
Crocus	Red parts become dark brown			
Cubeba	Not striking	Not striking		
Damiana	Darker—not striking			
Delphinium	Not striking			
Dioscorea	Darker	Light, shining bluish		
Echinacea	Darker	Bluish-gray		
Euonymus	External surface darker	Shining whitish		
Eupatorium	Not striking			
Euphorbia Pilulifera	Darker	Not striking—yellowish-green		

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Fœniculum	Not striking			
Frangula	Inner surface of bark is reddish	Reddish		
Gambir		Rusty red		
Gelsemium	Bark dark brown with occas. blue spot where surface has been scraped	Shining light blue		Fracture shows weak purplish-white
Gossypii Radicis Cortex	Darker—not striking			
Grindelia	Darker—not striking			
Guaiacum		Striking bluish (deep) fluorescence		Bluish fracture not as intense as under Hanovia, where it is striking
Guarana		Tan		
Hamamelidis Folium	Dark red			

TABLE I—CONTINUED

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Helonias	Rhizome shows rootlets which are bluish where outer surface has been lost	Brilliant baby-blue, with darker center		Color noticeable but fainter—purplish-white
Humulus	Darker brown. Rachis varies from light yellow to bluish			
Hydrangea	Darker	Dull gray-blue		
Hydrastis		Beautiful glowing golden yellow		Striking golden yellow fracture
Ipomœa	Not striking	Broken surface shows a purple zone between 2 light blue zones		
Iris	Root scars browner and more prominent. Rhizome shows wide areas of light blue and patches of brown	Internal grayish. External narrow patches of brown in places. Not striking		
Iris Versicolor	Alternate areas of dark and light brown	Bluish		

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Jalapa	Not striking	Zones of dark and light blue		
Juniperus	Not striking			
Kamala	Powder appears almost black			
Kola	Darker—not striking	Not striking		
Krameria	Not striking	Not striking		
Lappa	Dark, outer convex surface. Concave surface having shining blue irregular patches	Shining bluish		
Leptandra	Darker, with root bases bluish	Bluish to bluish-brown		
Lobelia	Rusty red			
Lupulinum	Yellowish-brown			
Manna	Heterogeneous mass of colors—shades of blue, yellow, tan, white—often shining, particularly the blue		Same play of colors, but weaker—satisfactory	

TABLE I—CONTINUED

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Mastiche	Not striking			
Matricaria	Composite color effect—purples, yellow, white, brown			
Mezereum	Outer surface—dark brown. Inner surf.—bluish white	Bluish		
Mitchella	Darker—slight purplish. Not striking.			
Persio	Not striking.			
Phytolacca		Brilliant blue		
Pinus Alba	Striking zones of shining purple and white. Brown lines present		Purplish with brown lines—satisfactory	
Plantaginis Semen	(a) *Blonde, ovate*—Mixture of purple, white and brown (b) *French*—dark brown, with shining bluish spots			

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Populi Gemma	Not striking	Yellowish-green		
Prunus Cerasus				
Pulsatilla	Scapes show various degrees of bluish and whitish	Scape fracture whitish		
Quassia	An interesting combination of blues, purples, greens, yellows and grays—colors often end abruptly			
Quillaja	Not striking—bluish			
Rhamnus Cathartica	Not striking	Orange or yellowish-orange		
Rosa	Reds become purplish Browns become tan Not striking			
Rubus Idaeus				
Sabal	Grayish to bluish	Fractured seed shining blue. Coat dark, not shining. Striking		

TABLE I—CONTINUED

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Salvia	Not striking—light grayish-purple			
Sambucus	Not striking			
Sanguinaria	Rhizomes dark brown, with tiny glowing orange spots	Orange and sometimes glowing yellow areas closely related to neighboring glowing red areas	Colors are like those obtained under the Hanovia, but weaker.	Satisfactory
Santalum Album	Not striking	Not striking		
Sassafras	Both outer and inner surface darkens	Scraped inner and outer surface reveals cream-colored region. In T. S. cream-colored region between darker borders		
Scutellaria	Not striking			
Senega	Dark roots with numerous light spots, especially in crown	Shining bluish-white		
Stillingia	Not striking	Grayish-purple		

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Strophanthus (Brown)	Not striking	Fracture—whitish		
Sumbul		Shining blue areas	When cork is torn, purplish—not striking	
Taraxacum	Outer surface dark brown, except at places of abrasion	Shining bluish-white		Purplish about a darker center. Satisfactory
Terebinthina	Not striking	Not striking		
Thymus	Not striking			
Trifolium	Not striking			
Trillium	Dark brown rhizome and roots, except when broken	Shining bluish-white	Not striking	Purplish-white Satisfactory
Triticum	Cut segments display a variety of color—blue, white, brown, black, yellow			
Ulmus	Not striking	Not striking		

TABLE I—CONTINUED

Name of Drug	Appearance of Whole Drug—Hanovia	Fracture—Hanovia	Whole Drug—Argon Lamp	Fractured Drug—Argon Lamp
Uva Ursi	Darker			
Vanilla	External surface of bean is olive green			
Viburnum Opulus	Inner surface—darker Not striking	Yellowish to bluish color		
Viburnum Prunifolium	Outer surface very dark-velvety. Inner surface darker, except when shining blue areas show through	Shining blue directly under cork. More intense than in Viburnum Opulus. Striking		
Xanthoxyli Fructus		White		
Xanthoxylum (a) northern	Outside surface—grayish Inside—purplish fluorescence	Whitish		
(b) southern				
Zea	Not striking			

*A PRACTICAL AND INEXPENSIVE VIVARIUM FOR THE BIOLOGY LABORATORY

By E. H. MacLaughlin†

This presentation, well received by the Plant Science Seminar, as was the actual exhibit, is worthy of consideration because of its practical and economical character.

LIVING plant and animal specimens are necessary for the maintenance of student interest in the biology laboratory. However, it is not possible to collect suitable living organisms throughout the entire year, and often the purchase prices quoted by biological supply houses prohibit the use of many.

The members of the biology department of the Philadelphia College of Pharmacy and Science felt that if suitable space and containers were available, large cultures of certain organisms could be developed for use when needed, without the necessity for maintaining them during the entire year.

A small, well-lighted triangular laboratory, nineteen by nineteen by twenty-six feet, equipped with laboratory tables, lockers, shelving, gas, water and electricity was made available. Wide shelving for holding aquaria and culture jars was extended from floor to ceiling on the twenty-six-foot wall of the laboratory. Aquaria were purchased from dealers abandoning the breeding of tropical fish, excellent ten-gallon rectangular aquaria costing only one dollar each. Additional heat needed during winter nights was supplied with two inexpensive 1000-watt electric heaters.

Most of the following equipment was obtained at very small cost by purchasing distressed merchandise and by constructing some articles in the college workshop.

1—20 gallon aquarium
15—10 gallon aquaria
4— 6 gallon aquaria
1— 2 gallon aquarium
3—15 gallon culture water bottles
5— 1 gallon battery jars

*Philadelphia Meeting, Plant Science Seminar, 1937.

†Biology Laboratories, Philadelphia College of Pharmacy and Science.

15— 1 gallon wide mouth jars (pickle jars)
24— 1 quart mason jars
50 earthenware flower pots, assorted sizes
20 galvanized wire animal cages (made by students)
2 patent seed germinators
10 wooden seed flats
10 Lustra glass plates for covers
Numerous small culture bottles, test tubes, petri dishes, etc.

Specimens are obtained on field trips by faculty members and students, or small quantities are purchased from biological supply houses and developed into large cultures. Local pond waters have furnished many interesting specimens which have been isolated and cultured. Students living in distant parts have obliged by bringing specimens when returning from vacations.

Information on the care and feeding of organisms is obtained in part from the supply houses, but largely from our own experiences. As a result we are able to maintain over considerable periods of time, organisms included in the following list, many in sufficient quantity for class study.

LIVING PLANTS

Algae
Chlorella
Pleurococcus
Spirogyra
Oscillatoria
Diatoms

Lichens
Some unidentified species

Mosses
Polytrichum
Sphagnum

Ferns and Club Mosses
Various species of Ferns
Fern spores
Fern prothallia (agar media)

Higher Plants
Seedlings of drug plants for Kilmer garden
Seedlings of corn, pea, mustard for class use

Fungi
Rhizopus
Penicillium
Aspergillus
Yeast

Elodea
Valisneria
Cabomba
Utricularia
Sagittaria
Salvinia
Water Hyacinth
Sundew
Venus Flytrap
Pitcher plant
Various cacti

LIVING ANIMALS

Protozoa
Amoeba
Difflugia
Radiolaria
Euglena
Paramecium
Colpoda
Stylonychia
Blepharisma
Stentor
Vorticella

Coelenterata
Hydra oligactis
Hydra viridissimus
Metridium

Rotifera
Rotifers of various species

Platyhelminthes
Planaria

Annelida
Lumbricus
Tubifex
White worms (Enchytrae)

Mollusca
Pond snails
Red snails
European edible snails

Arthropoda
Crayfish
Daphnia
Cypris
Cyclops
Gammarus
Mosquito larvae
Drosophila
Meal worms (Tenebrio)

Chordata
Tropical fish
Goldfish
Salamanders
Frog's eggs
Tadpoles
Leopard frogs
Bullfrogs
Green frogs
Green turtles
Painted turtles
Baby alligators
Horned toads
Garter snake
Pine snake
Milk snake
Albino rats

The Vivarium is also used by research students who may need space and equipment for living organisms. Hence an effort spent in caring for the specimens is well repaid in student interest, and in first-hand knowledge obtained from the continuous observation of the life cycles represented.

Portion of the Vivarium Showing Aquaria and Cultures.

Anti-Blood Clotting Agent Clue to Thrombosis Treatment. Science News Letter, Sept. 18, 1937. A report on the prevention of blood clotting or thrombosis was presented at the meeting of the American Chemical Society in Rochester, N. Y., by Dr. Edwin Chargaff, of the College of Physicians and Surgeons of Columbia University.

The material known as cerebroside sulfuric acid, produced by combining a small amount of sulfuric acid with a waxlike substance found in the brain, was found to very markedly check the clotting of blood. That injections of Heparin—the most powerful anti-blood-clotting substance known—have prevented thrombosis to a considerable extent in animals was recently reported by Drs. Best, Charles and Cowan, of the University of Toronto. A study of the practical application of Dr. Chargaff's discovery is now under way.

H. P. F.

ABSTRACTS FROM AND REVIEWS OF THE LITERATURE OF THE SCIENCES SUPPORTING PUBLIC HEALTH

Bacteriology . . . . Louis Gershenfeld, B. Sc., Ph M.
Biochemistry, Nutrition, etc. . . . Arno Viehoever, Ph. D.
Biology . . . . . Marin S. Dunn, Ph. D.
Chemistry . . . . . Arthur Osol, Ph. D.
Pharmacy . . . . . E. Fullerton Cook, Ph. M.
and their assistants

Sodium Formaldehyde Sulfoxalate in Experimental Poisoning by Mercuric Chloride. W. Modell, H. Gold, G. Winthrop and E. B. Foot, *Jour. Pharm. & Exper. Therap. 61,* 66 (1937). The use of sodium formaldehyde sulfoxalate has come into prominence as an antidote for bichloride of mercury poisoning following a series of papers by Rosenthal. The present authors explored further the necessary conditions and the range of the antagonism of this substance towards mercuric chloride. Their summarized results were as follows:

1. The general observation made by others was substantiated, namely, that animals given sodium formaldehyde sulfoxalate under experimental conditions survive oral or intravenous doses of mercuric chloride which would otherwise prove fatal.

2. The degree of protection afforded is greatly limited by the extreme speed with which corrosive sublimate produces injury and by the toxicity of the end-product of the reduction (especially intravenously).

3. When both the mercury and antidote are given intravenously the animal is unable to survive much more than one fatal dose of mercury even under most favorable conditions.

4. The end product of the reduction when injected intravenously is one-half to one-third as toxic as mercuric chloride.

5. When both drugs are given orally the degree of protection afforded is greater than against intravenous doses of mercury. The protection diminishes as the dose of mercury is increased and the interval between the two drugs is lengthened.

6. Alkalinization of the sulfoxalate solution by means of sodium bicarbonate accelerates the speed with which the reduction of the mercuric chloride takes place and greatly enhances the effectiveness as an antidote by oral administration.

7. The indications are that while sulfoxalate may prove of some clinical value in reducing the mortality in bichloride poisoning, the problem of controlling the chief cause of the high mortality in human poisoning remains unsolved. L. F. T.

Raisin Seed Oil. R. F. Eaton, *The American Perfumer 34,* 4 (1937). As early as 1900 an oil was prepared from the dried seeds of grapes, grown in Southern France, the product being used principally as a substitute of olive oil. At present, California produces the greatest volume of grape seeds. It is reported that as many as 4000 tons a year have been produced by the grape industry. Only the muscat variety of grape produces a seed which contains sufficient oil to be economically recovered. Modern mechanical methods are used to free the seeds of pulp, they are then dried in rotary steam driers and stored for curing. Dried raisin seed contains about 17.1 per cent. of oil which is obtained by the method of grinding, preheating hydraulic pressing, settling, refining, bleaching and wintering. The remaining press cake finds use as a cattle food and as fertilizer.

Investigations of the use of Raisin Seed Oil in the cosmetic industry were started a few years ago principally due to the fact that the oil was lacking in odor, was tasteless and completely lacked the yellow color of most other edible vegetable oils. Hence the cosmetic manufacturer was not confronted with the problem of masking the odor or forsaking a desired color in his product as he was when using olive oil with its characteristic odor and color. The batches of creams and lotions made in 1934 also proved more stable than the control preparations made with other vegetable oils; the author does not believe however that a preservative, anti-oxidant or an inhibitor is unnecessary in Raisin Seed Oil preparations. In these experiments the benzyl ester of parahydroxy benzoic acid was found most effective as a preservative, 0.05 per cent. being necessary in creams of a medium oil content. As anti-oxidants for pharmaceuticals and cosmetics, gum guaiac, maleic anhydride or hydroquinone in 0.1 per cent. proportions produced the best results. In 1935 tests were

made on white rats bearing out the compatibility of Raisin Seed Oil with the skin, no noticeable signs of irritation being produced.

Formulas for creams and lotions using Raisin Seed Oil as well as an analysis of the oil are included in the article. H. P. F.

Zinc Sulfate Pontocain Solution Urged as a Preventive of Polio. Science News Letter, Sept. 18, 1937. The newest preventive method against infantile paralysis is by having a zinc sulfate, pontocain solution, dropped or sprayed in the child's nose; this should be done by a physician specially trained in such work. This advice is given by Dr. Max Peet, of the University of Michigan, who with Drs. Dean H. Echols and Harry J. Richter have devised a new technic for using the solution which should make it more effective. The solution devised by Drs. E. W. Schultz and L. P. Gebhardt, of Stanford University, contains 1 per cent. zinc sulfate, 0.5 per cent. sodium chloride and 1 per cent. pontocain; the latter being a local anesthetic used because the zinc sulfate is irritating and may cause smarting, running of the nose and even earache. The zinc sulfate solution is said to be more effective than the alum-picric acid spray devised by Dr. Chas. Armstrong, of the United States Institute of Health, and when tested on monkeys has protected the animals for a longer period of time. To be effective against infantile paralysis the spray must reach the olfactory area far at the back of the nose. The virus causing infantile paralysis enters the body at this point and travels along the nerve of smell to nerve centers of the brain and spinal cord. The spray hardens the tissues, keeping the virus from passing through. Dr. Peet and his associates have found that an atomizer with a long thin metal tip will get the solution into the olfactory area, ordinary atomizers will not accomplish this. While using the atomizer the child's head must be tilted backward at about 45 degrees. Neither parents nor a physician unfamiliar with the technic of application can accomplish the required spraying with safety or satisfaction. For children under eight years, Dr. Peet advises dropping the solution into the child's nose while the child is lying on a table with his head hanging over the edge. The child's head should be kept in this position for about two minutes. The zinc sulfate pontocain spray causes a little discomfort to children and more to adults. H. P. F.

Removing Stains From Mottled Enamel. J. Wilson Ames, *Journal of the American Dental Association 24,* 10 (1937). Mottled enamel is a developmental defect of teeth resulting from drinking water and perhaps eating foods containing fluorine during the period of tooth calcification. Fluorine in drinking water in concentrations of one part or more per million is capable of causing this phenomenon. The affected teeth are usually glazed on the surface, may be paper white and devoid of translucency or have this paper white as a background with areas of yellow or brown or even black. These areas are irregular in outline and varied in shape. Technical Bulletin No. 52, published by the University of Arizona, shows the results of experiments on rats performed by Isaac Schour and Margaret C. Smith, who, by diet feeding and injections, furnished proof that fluorine was the causative factor in this condition. As a result of a survey, United States Public Health Bulletin No. 1581 shows half or more of the forty-eight states have areas in which mottled enamel is found.

Formerly methods for removing stains from mottled enamel resulted generally in grinding away most of the tooth enamel. Of the many formulas tried for elimination of this stain a mixture of five parts of 100 vol. hydrogen peroxide and one part of ether proved the most effective. The author describes in detail the technic used in removal of the stain. In no case did the author have a failure although some cases responded to treatment better than others. The length of time required for the removal of a stain cannot be predicted with any degree of accuracy. Three years have elapsed since the first case was treated and in no case treated has there been a recurrence of stain. The prevention of enamel mottling is largely an educational matter. In regions where fluorosis occurs endemically or where fluorine in the drinking water is found, the use of collected rain water from birth until the age of seven years should prevent its development. H. P. F.

Chemical Removes Fluorine. Science News Letter, Sept. 18, 1937. Dr. Howard Adler and George Klein, of the Victor Chemical Works, have found that the use of tri-calcium phosphate will prevent the mottled coloring from children's teeth caused by traces of fluorine in the drinking water of the midwest. Tri-calcium phosphate dried to a powder from a watery gel absorbs fluorine compounds readily

it was explained. Ten pounds of the substance will remove sufficient fluorine from 560 gallons of water to render the small impurity harmless. H. P. F.

An Improved Method for Determining Ethyl Alcohol in the Presence of Acetone. C. R. Hoskins, *Analyst 62,* 530 (1937). Ordinary methods of determining ethyl alcohol in the presence of acetone involve the preliminary removal of the acetone. In one the acetone is condensed with benzaldehyde in the presence of potassium hydroxide, the excess of benzaldehyde being subsequently removed. This process results in loss of alcohol giving low results. The second method removes the acetone by condensing it paraformaldehyde in the presence of alkali. The objection in this method is the formation of traces of methanol.

The proposed method first approximates the acetone content by the method of Adams & Nicholls (*Analyst 54,* 2 (1929)), namely, condensing the acetone with *o*-nitrobenzaldehyde in the presence of alkali and determining the indigo formed colorimetrically. This having been done, a portion of the sample containing not more than 1 cc. of acetone is introduced into a distilling flask of approximately 750 cc. capacity. For each 0.1 cc. of acetone present is added 25 cc. of an acid mercuric sulfate solution (50 gm. HgO plus 125 cc. conc. H_2SO_4 per L.) and 0.2 cc. of a sodium formate solution (100 gm./L.). The flask is connected with an efficient reflux condenser and is heated in such a manner that clouding (ppn. of Hg complex) takes place in about ten minutes. The flame is then lowered and the solution maintained at approximately the same temperature for ten to twelve minutes, washing down the condenser with a few cc. of distilled water. Following this an excess of a potassium oxalate solution is added (300 gm./L.) through the condenser to precipitate the excess $HgSO_4$. The flask is cooled, the condenser again washed with a little distilled water, and finally the liquid is distilled collecting about 150 cc. of distillate, redistilling this to a smaller volume and determining the alcohol presence by density measurement. The formation of the mercury complex takes place at approximately 80 degrees C. By avoiding any appreciable rise above the clouding temperature of the solution and by precipitating the excess of mercuric sulfate when condensation with the acetone is complete, the oxidizing action of the mercuric sulfate on the alcohol is greatly reduced. The addi-

tion of sodium formate, which appears to be preferentially oxidized by the mercuric sulfate, also slightly lessens the oxidation of the alcohol during the initial heating period. Tables are given showing the efficiency of the method which appears to be good. L. F. T.

The Detection of Inhaled Hydrocyanic Acid. G. W. Elsdon and J. R. Stubbs, *Analyst 62,* 540 (1937). There are very few cases on record where hydrocyanic acid has been found in the blood of those who have died by inhaling an atmosphere containing a very small amount of this gas. A case of positive identification is described wherein the following procedure was employed. A portion of blood (250 cc.) from the lungs was steam distilled until 15 cc. of distillate were obtained. Using 5 cc. portions of this distillate the following tests were applied with positive results indicating an estimated hydrocyanic acid content of .001 gm./L.

Prussian Blue Test. To 5 cc. of distillate add two or three drops of a 5 per cent. sodium hydroxide solution followed by two drops of 5 per cent. ferrous sulfate and one drop of 3 per cent. ferric chloride. The mixture is then allowed to stand for two minutes, gently heated, and acidified to the point that the solution is just cleared with hydrochloric acid. Traces of cyanide may show only after fifteen to thirty minutes, but on standing overnight a blue precipitate settles out.

Sulfocyanide Test. To 5 cc. of distillate add one drop of yellow ammonium sulfide solution and heat for fifteen minutes on the water bath. Dilute nitric acid is then added until the color is (just) entirely destroyed. A solution of ferric alum is then added until the maximum color is obtained. L. F. T.

Chemotherapy of Virus Diseases With Sulfonamide Compounds. S. M. Rosenthal, J. G. Wooley and H. Bauer, *Public Health Reports 52,* 1211 (1937), No. 36. The authors report comparative results on the activity of various sulfonamide compounds against the virus of choriomeningitis. Mice were inoculated intracerebrally with a potent strain of the virus and then treatment was begun within an hour by injecting subcutaneously suspensions of the drug in olive oil. The action of Prontosil, Prontosil Soluble, sulfanilamide, disulfanilamide and chrysoidine R (an azo dye related to Prontosil but containing no sulfamido group) was determined.

No appreciable curative action was demonstrated for any of them except Prontosil (4-sulfonamide-2-4′-diamino-azobenzene) which brought about survival of thirteen out of fifteen mice as compared with three survivors out of twenty-five controls. The results are of considerable interest since it is the first time that any drug has demonstrated chemotherapeutic action against a virus infection. Furthermore, it is striking that although the other sulfanilamide drugs are more effective against streptococci, meningococci and pneumococci they are practically inactive against this virus.

No therapeutic activity was obtained against the influenza or encephalitis virus with Prontosil or the related compounds studied.

L. F. T.

The Influence of Vitamin C Deficiency Upon the Resistance of Guinea Pigs to Diphtheria Toxin. A. Sigal and C. G. King, *Jour. Pharm. and Exper. Therap. 61,* 1 (1937). It has been shown in a number of laboratories that a deficiency of vitamin C is accompanied by a decreased resistance against infections and the injuries resulting from bacterial toxins. Of particular significance is the observation that the lowered resistance is manifested in the zone of depletion before there is any sign of scurvy or marked cessation of growth in young animals. The mechanism of detoxification *in vivo* accomplished by vitamin C is considered to be due probably to the better nutritional level of the animals rather than a direct action of the vitamin on the toxin. Numerous investigators have shown that diphtheria toxin or infection causes a lowered capacity to utilize glucose, the lowered dysfunction characteristically increasing with the severity of the toxemia and frequently accompanied with an excessive loss of vitamin from the tissues.

In an earlier investigation the authors showed that vitamin C deficiency alone could affect the carbohydrate metabolism of guinea pigs and that such disturbance could be rapidly corrected by readministration of the vitamin. The present paper reports a quantitative study of the influence of pre-scorbutic vitamin C deficiency upon the disturbance in glucose metabolism that results from sublethal diphtheria toxin injections. The standard type of glucose tolerance test was used as a measure of the capacity to utilize glucose.

The degree of dysfunction was found to be influenced to a significant degree by the state of nutrition of the animals. The sublethal toxin injections caused a greater disturbance in animals re-

ceiving only enough vitamin to prevent scurvy compared to those receiving a more generous supply. It was evident that the level of vitamin C intake for optimum *in vivo* detoxification is considerably greater than that necessary to protect from scurvy or to show a favorable growth rate. L. F. T.

Studies Relating to the Toxicity of Fluorine Compounds. C. A. Kempf, D. A. Greenwood, V. E. Nelson, *J. Lab. Clin. Med. 22,* 1133 (1937). Mottled enamel of the teeth is due to fluorides which may run as high as seven to twelve parts per million in the water (Ankeny, Iowa). All children reared in this community and drinking from the general water supply have mottled teeth, the fluorides attacking the enamel during the calcification of the permanent teeth. This has been proven by analysis and feeding experiments with rats. Fed sodium fluoride or fluoride water, the rats in all cases developed mottled enamel very similar to that observed in man. In dogs the deciduous teeth were not obviously affected but marked changes occurred in the enamel of the permanent teeth.

Experiments were made to determine the effects of organic fluorides on the enamel of the teeth. Alpha-fluoronaphthalene produced mottled enamel while p,p¹-difluorodiphenyl, p-difluorobenzene had no visible effect.

The ingestion of aluminum sulphate along with fluorides markedly reduces and may prevent the effect of fluorine on the teeth. While calcium silicofluoride and cupric fluoride caused mottled enamel, Al_2F_6 did not. Encouringing results in lowering the fluorine content of the water by the use of a combination of alum and hydrochloric acid is reported.

Oral administration of 0.45–4.52 mg. of fluorine as sodium fluoride per kg. body weight in dogs caused no effect on total Ca, acid soluble inorganic P, hemoglobin or coagulation time of the blood, while radiographs after the higher dosage showed no changes in the bones. I. C.

Sodium Mandelate as a Urinary Antiseptic. H. F. Dietrich, *Am. Jour. Dis. Child. 54,* 496 (1937). Mandelic acid (or its sodium salt) exhibits the following characteristics: non-toxicity following oral administration, excretion into the urine in unchanged form, and bactericidal action in the urine. Acute and chronic urinary infections in a series of five infants and eleven children were treated with sodium

mandelate and ammonium chloride. The intake of fluids was limited to from 800-900 cc. per day. The daily dosage of mandelic acid (in the form of mandelate) varied, according to the patient, ranging from four to twelve grams. In eleven of the patients the urine became sterile in from three to ten days and remained so for the duration of hospitalization. Temporary sterility in the urine was observed in three additional patients. In favorable instances, the urine was strongly bactericidal; some organisms other than bacilli coli-communior and bacilli coli-communis are killed by the urine containing mandelic acid. In four patients evidence of renal irritation, appearing during the treatment, disappeared when the sodium mandelate was omitted. I. C.

Silver Picrate Treatment of Vaginal Trichomoniasis. L. J. Golub and H. A. Shelanski, *J. Lab. Clin. Med. 22,* 1155 (1937). *Trichomonas vaginalis* (infusorian) is believed to be pathogenic in the human vagina, and in many cases infestation is accompanied by a vaginal discharge, erosion of cervix of uterus and hemorrhagic spots in the vagina, and, commonly, with burning and itching of the external genitalia.

Unusual success was reported in treating twenty-five cases, for in all patients, after the course of therapy, the presence of the organism was negative as determined by a described vaginal fresh smear and culturing technique. Five grams of a 1 per cent. dispersion of silver picrate in kaolin was applied to the vagina with an occluding insufflator. A suppository containing 2 gr. of silver picrate was inserted each night by the patient and, at the end of the week, the insufflation was repeated and six more suppositories given. Two such treatments were the usual routine, and where associated conditions or complications were present, additional treatments (three in the most stubborn case) were given. Reinfection was due in three cases from the prostatic fluid of husbands. The patients were instructed to return after each menstrual period for a re-examination, which was repeated for varying periods of time in each case from three to nine months.

The following precautions should be observed during treatment: removal of mucus plug, when present, from external os (for the prevention of reinfestation following menstruation if organisms are present in the plug), abstinence from intercourse, douches, and tub baths. I. C.

A New Method for the Evaluation of Germicidal Substances. A. J. Salle, W. A. McOmie and I. L. Shechmeister, *Jour. Bact. 34,* 267 (1937). The evaluation of an antiseptic solely on the basis of its phenol coefficient is unsound particularly when it is to be employed in contact with living tissue. There would be little advantage in using a compound with a phenol coefficient of 10 on mucous surfaces if it possessed a toxicity to tissue ten times that of phenol.

A more accurate method of rating is proposed in which germicides are tested for their effect on the growth of living embryonic tissue as well as for their ability to kill bacteria. A number known as the toxicity index is determined by dividing the highest dilution required to prevent the growth of embryonic chick heart tissue during forty-eight hours by the highest dilution required to kill the test organism after an exposure of ten minutes. Theoretically the smaller the toxicity index the more nearly perfect the germicide. An index greater than one indicates that the germicide is more toxic to tissue than to bacteria, whereas an index less than one indicates the reverse. When different bacteria are used for the test organisms a somewhat different toxicity index is obtained. Two tables are presented. The following table is given for the *E. typhosa.*

Germicide	Highest Dilution Showing No Tissue Growth = A	Highest Dilution Showing No Growth of E. Typhosa = B	Toxicity Index A/B	E. Typhosa Phenol Coefficient
Iodine	1 : 1,800	1 : 24,000	0.08	240
Potassium mercuric iodide	1 : 12,000	1 : 110,000	0.11	1,100
Mercuric chloride	1 : 45,000	1 : 180,000	0.25	1,800
Iodine trichloride	1 : 2,400	1 : 8,500	0.28	85
Metaphen	1 : 76,000	1 : 90,000	0.84	900
Hexylresorcinol	1 : 21,000	1 : 7,500	2.8	75
Phenol	1 : 840	1 : 100	8.4	—
Merthiolate	1 : 176,000	1 : 5,000	35	50
Mercurochrome	1 : 10,500	1 : 300	35	3

The results show that the inorganic compounds rate considerably better than some of the newed organic preparations. In both series iodine gave the lowest toxicity index while mercurochrome proved to be the most toxic. Of the newer organic preparations examined hexylresorcinol gave the lowest toxicity index on *S. aureus* while metaphen gave the lowest figure when tested on *E. typhosa.* As a germicide merthiolate is over 100 times more potent than mercurochrome but only one-eighth as toxic to tissue. L. F. T.

Determination of Coumarin in Vanilla Extract. Ira J. Duncan and R. B. Dustman, *J. Ind. & Eng. Chem., Anal. Ed., 9,* 416 (1937). A steam distillation method for the determination of coumarin in vanilla extracts is described. The addition of a small quantity of potassium sulfate prevents the interference of vanillin. Coumarin in the distillate is determined colorimetrically by a modification of the Stevenson and Clayton method, involving a coupling reaction with p-nitroaniline after previous treatment with sodium carbonate.

In a large number of synthetic mixtures, in which coumarin was added to vanilla extract, quantitative results were obtained with a maximum error of 2.6 per cent. In most cases the error did not exceed 1 per cent. The method is therefore recommended for the examination of factitious or adulterated extracts of vanilla. L. A. R.

Ants and Their Control in California. J. E. Echert and A. Mollis, *Agr. Exp. Sta., Berkeley, Calif.* Circular 342, July, 1937. Noxious ants cause injury in many ways: Invasion of buildings in search of food thus becoming a household pest, destructions of lawns, gardens, seedbeds, or orchards by their nesting habits, destruction of plants, fruits, seeds and nuts. While the circular treats with the identification and control of ants found exclusively in California, the control methods should be of some interest to pharmacists nationwide. Hence the formulas are listed here.

Repellants: The following materials have been used with varying degrees of success in repelling ants:

Camphor, naphthalene flakes, paradichlorobenzene, carbolic acid emulsions, corrosive sublimate, turpentine, coal oil, and oil of citronella.

FORMULA 1.

Carbolic Acid Bands

Crude carbolic acid (phenol solution) ..... 1 pint
Fish-oil soap ..... 1 pound
Water ..... 3 gallons
For use around bases of trees.

FORMULA 2.

Sulfur Bands

Finely pulverized sulfur ..... 1 part by weight
Commercial "tree-sticky" or tanglefoot. 6 parts by weight
Mix thoroughly without heat. Effective 3-6 months. Wrap site of application with tape and place mixture on the tape to prevent injury to tree through absorption.

Contact Insecticides: Kerosene kills on contact and makes the soil undesirable for nesting. Commercial fly sprays can also be used but do not serve as permanent remedies.

FORMULA 3.

Kerosene and Pyrethrum Mixture

Pyrethrum ..... ½ pound
Kerosene ..... 1 gallon
Mix thoroughly after allowing to stand for about 12 hours. Pour off the clear liquid. This mixture is useful against timber ants, which disappear when it is injected into the timbers occupied by them.

FORMULA 4.

Nicotine Sulfate
(Black Leaf 40.)

Nicotine sulfate (commercial) ..... 1 part
Water ..... 800 parts
Use as spray. Kills the aphids on which ants feed.

FORMULA 5.

Soap Wash

Common laundry soap ..... ½ to 1 pound
Water ..... 1 gallon
Use this wash, after soap has dissolved, on lawns that have become infested with ants.

Fumigants: Carbon disulfide and calcium cyanide may be used. *Utmost precaution* is necessary with the latter.

FORMULA 6.

Ethylene Dichloride and Carbon Tetrachloride Mixture

Ethylene dichloride	3 parts (by volume)
Carbon tetrachloride	1 part (by volume)

The above mixture is much safer than carbon disulfide alone. The combination is not inflammable, explosive or dangerous to handle. Ethylene dichloride used alone is inflammable and should be handled with due care.

FORMULA 7.

Pyrethrum and Soap Solution

Concentrated pyrethrum extract	1 part
(With ordinary household pyrethrum insecticides use 2 parts)	
Soapy water	1,000 parts

To kill colonies among growing plants, scrape away the top of the nest and pour the liquid into this.

Stomach Poisons:

FORMULA 8.

Sodium Arsenite

(U. S. Government Formula)

Sugar granulated	1 pound
Tartaric acid (crystallized)	10.3 grains
Benzoate of soda	14.6 grains
Water	1 pint
Sodium arsenite	26 grains
Honey	2 1/3 ounces

Warm one pint of water in a clean vessel over a low fire. When it is tepid, add the tartaric acid, then the benzoate of soda, and then the sugar slowly, and stir constantly to prevent burning. Measure depth of liquid with a stick. Slowly bring liquid to boil, and allow to simmer for thirty to forty minutes. Remove from heat source, compensate for evaporation and stir in the honey before cooling. Add the twenty-six grains of the sodium arsenite, which has been dissolved in 1.8 fluid ounces of hot water and partially cooled before pouring into the syrup.

FORMULA 9.

The California Argentine Ant Syrup

Honey (any aromatic kind)	18 1/3 ounces
Tartaric acid (crystallized)	10.3 grains
Benzoate of soda	14.6 grains
Water	1 pint
Sodium arsenite	26 grains

The substitution of aromatic honey for sugar in Formula 8 will give as good or better results in the control of the Argentine and other sweet-loving ants. The prolonged boiling here is not necessary since the honey already contains invert sugars, hence the tartaric acid may be omitted and boiling may be curtailed, just so that yeasts, molds, etc., are destroyed.

FORMULA 10.

Grease Baits

Sodium arsenite	10 grains
Grease	1½ pints

Warm the grease and mix thoroughly with the sodium arsenite.

FORMULA 11.

Sodium Fluoride and Pyrethrum

Sodium fluoride	6 ounces
Pyrethrum (fresh)	2 ounces
Cornstarch	2 ounces

Dust freely.

FORMULA 12.

Tartar Emetic and Sugar Syrup

Tartar emetic	1 part by weight
Sugar	10 parts by weight
Water	100 parts by weight

Mix thoroughly. The addition of honey makes it attractive to ants. I. C.

Experiments on the Sterilizing Effects of Mixtures of Air and Steam and of Superheated Steam. R. M. Savage, *Brit. Pharm. Conference Meeting* (July 29, 1937), through *Chemist and Druggist 127*, 158 (1937). Studies did not yield evidence that mixtures of air and steam are less effective than steam alone, provided that the spores are exposed to the temperature as designated. L. G.

Experimental Immunization by Living and Pathogenic Staphylococci. G. Ramon and R. Richou, *Campt. rend. soc. biol. 125,* 792 (1937). The production of staphylococcus antitoxin was stimulated in horses and rabbits by inoculation with living pathogenic staphylococci incorporated in lanolin. Staphylococci killed by heating for thirty minutes at 60 degrees C. did not result in the production of antitoxin in rabbits. It is suggested that the living bacteria in lanolin remain at the injection area and elaborate their toxin. The local inflammatory process affects the toxic properties but does not modify the antigenic power of this toxin before it is absorbed. L. G.

The Isolation of Tetanus Bacilli From Street Dust. Its bearing on surgical practice. E. C. Gilles, *J. Am. Med. Assoc. 109,* 484 (1937). Twelve samples out of sixty-three samples of street dust obtained in Baltimore or 17.4 per cent. of the total revealed the presence of tetanus bacilli. Such findings reveal the necessity for the use of prophylactic injections of tetanus antitoxin in all cases of street accidents accompanied by laceration or abrasion of the skin. The fear of serum reactions does not justify the failure of employing protective antitoxin in every case of street accident in which open wounds occur, inasmuch as street dust has been shown to be a possible source of danger. L. G.

The Prophylaxis of Typhus Fever and Vaccination Against that Disease. Quarterly Bulletin Health Organization League of Nations 6, 205 (1937). The 1937 Geneva Conference on typhus prevention concluded that living virus vaccine confer greater protection than killed virus vaccines. They recommended that living virus vaccines though accompanied by a greater risk, should be used during periods of epidemics for mass vaccinations and that killed virus vaccine be used for vaccination of medical, sanitary and auxiliary staffs in countries free from but threatened by typhus, as in Spain at present. The killed vaccines are more difficult to prepare and cost more than the live virus vaccines. Delousing is to be practiced even though vaccination is employed. Convalescent typhus serum gives protection for only two to three weeks. The selection and method of preparation of typhus vaccine are to be under the jurisdiction of health authorities of the country in which vaccine is to be used though an appendix presents a bibliography of articles on the Weigl, Blane and Laigret vaccines. L. G.

SOLID EXTRACTS

By Ivor Griffith, Ph. M., Sc. D.

Despite the form in which this information is presented it may be accepted as trustworthy and up-to-date. Original sources are not listed but they may be obtained upon request.

Smoke your cigarette through a sister cigarette, and nearly half the nicotine in the smoked cigarette, remote from the mouth, will be absorbed by the second cigarette, acting as a filter. A special mouthpiece has been constructed into which the filtering cigarette is placed, the lighted fag being perched at the end of the mouthpiece. This of course necessitates a rather lengthy assembly protruding from the lips, but we have it on good authority that it works well in nicotine removal and that the cartridge is good for twenty to thirty smokes.

And it does keep one away from smoking!

Ozone, the rather pungent oxygen polymer, so frequently associated with electric discharges is the newest idea in food preservation. Increased use of the gas was predicted by Professor Arthur W. Ewell of the Worcester Polytechnic Institute.

Eggs stored in ozone for eight months, he declared, are indistinguishable from those but a few days old and meat can be stored up to sixty days in it with no mold or slime forming.

The most recent gland tidings to the dairyman of how an extract of the pituitary gland, when injected into a cow, can increase its milk production from 10 to 350 per cent. was described by Dr. A. C. Fay, at a food technology conference.

The research is still in the experimental stage, he said, but it gives promise of great utility to the dairy industry. The importance of the dairy industry in the nation's food supply, it was pointed out, is tremendous, for of the ton of food consumed annually by each person in the United States, 45 per cent. is composed of dairy products.

Believe it or not, but brewing now brags of its scoops in science. In a little bragging brochure which came in our otherday mail we learn that it was the first industry to recognize the importance of biological cleanliness through the outstanding work of its great benefactor, Louis Pasteur; that it was the first industry to recognize the importance of the use of controlled pure culture organism through the work of the great Emil Christian Hansen at the Carlsberg Brewery Laboratories in Copenhagen. Today the Dairy Industries and Medicine employ many of Hansen's methods; that it was the first industry to recognize the importance of the measurement and significance of active acidity as against total acidity in the work of Sörenson on Hydrogen Ion concentration at the Carlsberg Laboratories in Copenhagen.

It might have added that it was the first industry to rejoice in the Rooseveltian repeal. In 1937, it continues to brag that close to two billion gallons of beer will be brewed in these United States, which statistically reveals that every man, woman and child will consume over a gallon of this behopped and bubbled beverage during that year.

Brillat-Savarin was not a chef as many suppose, but an humble French advocat or lawyer. He did, however, become famous for his culinary writings, especially the work "Physiology of Taste." His is today, outside of our local Oscar of the Ritz, the most famous name in the history of cookery. Some of his apt aphorisms are frequently quoted:

"Beasts feed; man eats: the man of intellect alone knows how to eat."

"Tell me what you eat: I will tell you what you are."

"Drunkards and victims of indigestion are those who know not how to eat or drink."

"The most indispensable quality in a cook is punctuality: and no less is required of a guest."

"The fate of nations hangs upon their choice of food."

In one of his writings Brillat-Savarin pays the highest compliment to the delicacy of the sense of taste when properly cultivated. He speaks of a Roman gourmet who was able to distinguish, merely by the difference in flavor, a fish caught between certain bridges from

one caught further down the river. He also tells of some of his own contemporaries who could distinguish the particular savour of a leg on which the partridge rests its weight while sleeping.

Few people know that Isaac Newton named the spectrum. This is the same Isaac Newton whose name is familiar to every schoolboy as the apple-inspired philosopher. I do not know whether the apple, which obeyed an impulse to drop on Sir Isaac's bald spot gave him, in addition to the gravitation clue, some suggestion of the complexity of light—I would have been certain of the dual discovery had the apple been a cocoanut.

His discovery was made through the use of a glass prism, much like the kind of a glass prism which children, in hanging lamp days, were wont to peer through to get an Easter egg effect out of everything examined.

Newton made his experiment, however, in a dark room, permitting a beam of sunlight to pass through a hole which, during Mrs. Newton's absence, he had clandestinely bored in their pale green shutter. When he passed this beam through a glass prism he found that it was broken up into a regular range of colors and that the beam was bent from its course, violet bending the most, red the least. These colors were previously known, of course, and some had names—but it had never been known what relation colors bore to light. The conventional order in which these colors appeared in Newton's and in every similar experiment is given as violet, indigo, blue, green, yellow, orange, red, which is the order in which they have appeared in every rainbow since the first one spread by a promise-giving God to his erring earthlings.

To this play of colors Newton gave the name "spectrum" in deference to its ghostliness, although variegated ghosts are not particularly common. Still the color effects of the spectrum are about as valuable as a ghost, and as unnatural as a shadow, for the artist cannot dip his brush in them and transfer them to his canvas.

The new mild tincture of iodine of the Pharmacopœia should actually "go places."

As a household antiseptic tincture of iodine has no equal. It combines the therapeutic qualities of iodine, as a counter-irritant and germicide with the local values of the solvent alcohol. It has a high degree of penetration in spite of its theoretical incompatibility with tissue. It is still the surgeon's first choice in rendering sterile the site of operation. When that part of the anatomical landscape has been selected where the surgeon wishes to open his subject, the customary ante-slicing performance is a generous dousing with an alcoholic or an ethereal soap solution. After a water wash this is followed by a liberal allowance of tincture of iodine. After a brief delay to permit the iodine to execute every single germ on location, the stain is cleared with alcohol, and the surgeon now gleefully goes to work. That is how much confidence most surgeons have in tincture of iodine.

Mercuro-chrome is an example of an antiseptic partnership. In its make-up the highly toxic qualities of mercury and its poor rate of dispersion, due to local coagulation, are compensated for by fluorescein, a dyestuff of high penetration and low toxicity. By the way the latest manifestation of mercuro-chrome is in the new germ-proof, kiss-proof and soup-proof mercuro-chrome lip salve.

A similar combination of iodine with fluorescein is already available under the name of iodeosine (tetra-iodo-fluorescein $C_{20}H_8I_4O_5$*). It has been used as an indicator, and possesses a color degree of dizzy red, not quite as spectacular however, as that of mercuro-chrome. So far as I know it has never been suggested as an antiseptic. It is unfortunately insoluble in water, although freely soluble in alcohol. A water-soluble sodium salt of this compound is known as erythrosine, and is a permissible coal tar color for camouflaging food. For all we know then, the bright red pop soda water of circus days may make a better gargle than a beverage.*